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ABSTRACT

Why do American infants have a greater amount of vocalization, and particularly of happy vocalization, than do Japanese infants? To answer this question, 30 Japanese and 30 American first-born, 3- to 4-month old infants equally divided by sex, and living in intact middle class urban families were observed in their homes on two consecutive days during 1961-1964. Two specific styles of child care were shown to be at work influencing the process by which learning of cultural expectations for behavior comes about. American mothers were busier, livelier, and differentiated in their response to their baby's happy or unhappy vocalizations. The Japanese mother's pace was more leisurely. She was more attentive to the baby when he was going to sleep or waking up and less responsive to vocalization in general. Apparently, these differences in maternal style of child care elicit behaviors from infants that are in line with later expectancies for behavior in the two cultures. A followup study of the first 20 of these same children in each culture as they became 2 1/2 and 6 years of age is being completed. It is expected that the early differences in behavior seen in infancy will continue along the lines laid down by the two cultures. [Not available in hard copy due to marginal legibility of original document.] (WY)

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TINY DRAMAS: VOCAL COMMUNICATION BETWEEN MOTHER AND INFANT IN JAPANESE AND AMERICAN FAMILIES

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In a recently published comparison of the everyday behavior of mothers and infants in Japan and America (Caudill and Weinstein 1969) our analysis led us to conclude that, despite areas of similarity, the styles of care-taking shown by the mothers are different in the two cultures. These different styles of care are linked to different patterns of behavior for the infants, and we concluded that by three-to-four months of age the infants have already learned (or have been conditioned) to behave in certain distinctive ways in each culture. A more abstract way of phrasing this idea is to say that by three-to-four months of age the infants have already learned, at least in nascent form, to be members of their culture, and that this has happened out of awareness and well before the development of language. Since the use of his voice is the main way that a young infant has of signaling to his mother (and when he is alone it is virtually the only way he has), this paper examines the characteristics of vocal communication between mother and infant in Japan and America in order to probe more deeply into the process of how the early learning of cultural expectations for

behavior may come about.

Our already published findings show that when mothers in the two cultures are involved in direct caretaking of their babies, the American mother does more chatting to her baby while the Japanese mother does more lulling of her baby. At the same time, the American infant has a greater amount of vocalization, and particularly of happy vocalization, than does the Japanese infant. When the babies in the two cultures are not being cared for there is no difference in the total amount of vocalization, but the American infant is greater in happy vocalization while the Japanese infant is greater in unhappy vocalization.[1] The analysis in this paper is primarily concerned with the question of why there should be these differences in the use of the voice by mothers and infants in the two cultures.

In order to answer this question we will first review the general methods and earlier findings of the study as background leading to the present analysis. Secondly, we will look at the pace of life for the mothers and infants across the total observations to see if a livelier or more leisurely approach to caretaking by the mothers is likely to affect their verbal behavior, and if variation in the awake-asleep cycles of infants is likely to affect the nature of their vocalization. Thirdly, we will turn to a more detailed examination of those times when the infants are awake and inquire into how quickly, and with what type of verbal behavior, the mothers in the two cultures respond to various kinds of vocalization by their infants. Finally, we will try to draw together and interpret what we have learned.

Background Leading to the Present Analysis

The data for this study come from naturalistic observations made on two consecutive days during 1961-1964 in the homes of 30 Japanese and 30 American first-born, three-to-four month old infants equally divided by sex, and living in intact middle-class urban families. Data on the ordinary daily life of the infant were obtained by time-sampling, one observation being made every fifteenth second over a ten-minute period in terms of a predetermined set of categories concerning the behavior of the mother (or other caretaker) and the behavior of the infant, resulting in a sheet containing 40 equally spaced observations. There was a five-minute break between observation periods, and ten observation sheets were completed on each of the two days, giving a total of 800 observations for each case. In the analysis already published, these data were analyzed by multivariate analysis of variance using three independent variables: culture (Japanese, American), father's occupation (salaried, independent), and sex of infant (male, female). The effects of each of these independent variables were examined while controlling on the other two variables, and culture proved overwhelmingly to be the most important variable. Interactions between the independent variables revealed nothing of importance.

In summary, and as background for the further analysis presented here, the general findings by culture in the earlier analysis show a basic similarity in the biologically rooted behavior of the infants in the two countries regarding the total time spent in intake of food (sucking on breast or bottle and eating of semi-solid food) and in sleep, and also

show a basic similarity in the behavior of the mothers in the two countries in the time spent in the feeding, diapering, and dressing of infants. Beyond these similarities, however, the American infants have greater amounts of gross bodily activity, play (with toys, hands, and other objects), and happy vocalization; in contrast, the Japanese infants seem passive, and only have a greater amount of unhappy vocalization. The American mothers do more looking at, positioning the body of, and chatting to their infants; the Japanese mothers do more carrying, rocking, and lulling of their infants.

In interpreting these general findings we felt that, first of all, the mothers in the two cultures are engaged in different styles of caretaking: the American mother seems to encourage her baby to be active and vocally responsive, while the Japanese mother acts in ways which she believes will soothe and quiet her baby. Secondly, we felt that the infants in the two cultures have become habituated to respond appropriately to these differences. We were, moreover, struck by the fact that the responses of the infants are in line with general expectations for behavior in the two cultures: in America, that the individual should be physically and verbally assertive; and in Japan, that he should be physically and verbally restrained. [2]

We were particularly interested in the greater happy vocalization of the American infant because it is significantly correlated with the mother's looking at and chatting to her baby. In contrast, the lesser amount of the Japanese infant's happy vocalization does not show any

clear pattern of relationship with the mother's behavior. This patterning of correlations is intriguing, and it does suggest a different use of vocal communication between infant and mother in the two cultures, but findings phrased in terms of correlations do not answer the question of how the flow of vocal communication actually proceeds in daily life in each culture. It is possible in this article to enter further into this problem by making use of the sequential property of the data over the 800 observations in each case.

In order to provide a framework for the sequential analysis of the observations we will make use of our earlier classification of the observations into what we call "states." Each observation may be classified into one of six states which are defined by the infant being either awake or asleep in combination with the mother doing caretaking, being merely present and not doing caretaking, or being absent. Table 1 gives the mean frequency of time in each of these six states over the total 800 observations by culture. [3]

(Insert Table 1 about here)

From the point of view of the mother, it is clear in Table 1 that there is not a significant difference between the cultures in the amount of time spent in the caretaking of awake babies (state 1). As a minor, but nevertheless interesting theme, it is true, however, that Japanese mothers spend more time in the caretaking of sleeping babies (state 4). Secondly, Japanese mothers are more passively present in the room with their babies regardless of whether the babies are awake (state 2) or

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asleep (state 5). Thirdly, there is no difference between the cultures in the amount of time that mothers are absent from the presence of awake babies (state 3), but American mothers are definitely more absent when their babies are asleep (state 6). From the point of view of the baby, it is clear that there is no difference between the cultures in the amount of time spent awake or asleep.

These findings from an analysis of the total observations present, of course, a static picture, and say nothing about the sequence in the shifts from one state to another across the observations. Necessarily, the six states do shift, one into another, across the 800 observations, and it is this property of shifts in states that is the first subject of analysis in this paper.

The Pace of Changes in State for Mother and Infant Across the Total Observations

The Pace of Changes in State for the Mother

The point of departure here is from the finding in Table 1 that mothers in both cultures spend approximately the same total amount of time in caretaking for awake babies. Nevertheless, it is our strong impression from work with the basic data that American mothers are more "in and out of the room" during the time their babies are awake and in need of caretaking. Thus, our reasoning is that the pace of caretaking is different in the two cultures despite the fact that the total time spent in caretaking for awake babies is about the same. If true, this difference

in the pace of caretaking would help to explain why American babies are more vocal in general, and particularly why they are more happily vocal. That is, if the American mother is starting and stopping her caretaking more frequently, then she is inadvertently providing more "natural" opportunities to talk to her baby at the beginning and ending of such periods (if nothing else, she is providing more times at which she is likely, in essence, to say "hello" and "goodbye" to her baby) with the probable effect that her voice will stimulate the baby to respond.

Thinking more specifically in terms of changes in the six states, the mother can shift her state from active caretaking (states 1 and 4) to not caretaking (states 2,3,5,or 6) or vice versa. In addition, because of the way in which the states are defined, it is possible to have a change in state from being merely present but not caretaking (states 2 and 5) to being absent (states 3 and 6) or vice versa. There is some reason to believe that the Japanese mother might be more involved in these latter situations because of her greater passive presence when the baby is both awake and asleep. In any event, the changes of state just described for the mother are logically exhaustive, and Table 2 gives the mean frequency of changes in state and the analysis of the rank order distribution of the cases by culture.[4]

(Insert Table 2 about here)

In Table 2 it can be seen that the American mother has, in total, significantly more changes of state over the 800 observations than does the Japanese mother. It is also clear that the bulk of these changes

of state in both cultures occurs in the shift from caretaking to not caretaking or vice versa. The frequency of shifts from being merely present to absent or vice versa is a minor matter, and only one of the four comparisons in this regard is significant: Japanese mothers do seem more to wait until their infants are asleep before shifting from being merely present to absent.

Since we know already (from Table 1) that mothers in both cultures spend approximately the same total amount of time in caretaking for awake babies, the most interesting finding in Table 2 is that American mothers have significantly more shifts in state from caretaking to not caretaking for awake babies and vice versa. This necessarily means that the American mother is, in fact, doing her caretaking in more frequent and shorter periods, and hence is providing more "natural" opportunities for vocal exchange between mother and infant at the beginning and ending of these periods. In this sense, the American mother might be thought of as more "attentive" to her baby than the Japanese mother, and certainly in her style of care the American mother appears livelier and more busy, whereas the style of the Japanese mother is more leisurely. [5]

The Pace of Changes in State for the Infant

Given the definition of the six states, there are only two ways in which the infant can change his state by himself: he can shift from being awake (states 1,2,or 3) to asleep (states 4,5,or 6) or vice versa. In addition to this, however, the mother can either be involved in the transition of the infant from awake to asleep (state 1 to states 4,5,or 6) or not involved (states 2 or 3 to states 4,5, or 6). The same thing is, of

course, true for the infant's transition in the opposite direction from being asleep to awake: the mother is either involved (state 4 to states 1, 2, or 3) or not involved (states 5 or 6 to states 1,2, or 3).

In general, we already know (from Table 1) that infants in both cultures are awake or asleep the same amount of time, but this finding does not tell us whether this behavior is patterned in the same way or not in the two cultures over the total observations. In approaching the analysis for this paper we did not have an hypothesis about this matter but, as can be seen in Table 3, it does turn out that there is a difference between the cultures.

(Insert Table 3 about here)

It is clear from Table 3 that, in total, the Japanese infant is more in and out of sleep across the observations than is the American infant. Closer examination of the findings in the table indicates, however, that when the mothers in the two cultures are <u>not</u> involved in the infants' going to sleep or awakening then there is no difference between the cultures in the number of such shifts. Presumably this lack of difference reflects the similarity in the biological processes of the infants in the two cultures when they are left alone to determine their own behavior in this regard. The greater total number of shifts for the Japanese infant is obviously due to the cultural fact that the Japanese mother is more involved in the active care of her infant both when he is going to sleep and when he is waking up.

The next question is: How do we explain the greater involvement of the

Japanese mother in the more frequent transitions of her infant in and out of sleep? A good starting point in answering this question is to call attention again to the finding in Table 1 that Japanese mothers do more caretaking of sleeping babies. From the earlier analysis (see Caudill and Weinstein 1969: 38-39) we know that the nature of this caretaking is very different in the two cultures: Japanese mothers do proportionately more feeding, carrying, rocking, and other care (wiping face, adjusting bedding, etc.) of sleeping babies, whereas American mothers are only proportionately greater in looking at sleeping babies. The greater feeding of sleeping babies occurs for the Japanese mother largely because she is more content to continue sitting, holding the baby who has fallen asleep with the nipple of the breast or bottle in his mouth; by definition the mother in this situation is still scored as feeding. The greater looking at sleeping babies for the American mother occurs because she has left her sleeping baby alone, and then returns periodically to the door of his room to check visually upon him, usually without doing any other caretaking.

For the analysis reported in this paper we returned to the basic observational data and examined what the mothers in the two cultures were doing in all instances in which they were involved in the transition of their infants from awake to asleep and vice versa. At the time of putting an awake baby to sleep, the Japanese mother does significantly more carrying, rocking, and lulling than does the American mother who, in contrast, puts her awake baby down in his crib, talks to him briefly, and after waiting a few moments to be sure he is comfortable, leaves the room.

A second, but quantitatively less important, area of difference is, as noted above, the more leisurely pace of the Japanese mother in terminating feeding after the baby has fallen asleep on the breast or bottle. In either situation in Japan, whether the baby is being carried and lulled to sleep or falls asleep after feeding, the important element is that the Japanese infant by three-to-four months of age has become used to going to sleep while being held in his mother's arms -- at least when he is aware that she is near him. The American infant, on the other hand, by the same age has become used to being put down in his crib to go to sleep by himself.

The different effect upon the infants of these two styles of care-taking is clearly evident in the observations. In Japan, the mother will succeed in getting the baby to go to sleep while carrying him, but when she puts him down he awakens and cries, so she picks him up and the process is repeated until finally the baby remains asleep. It is this process that accounts for the greater number of shifts from awake to asleep for the Japanese infant when his mother is involved; and it is also this process that provides one of the reasons why the Japanese infant has, in general, more unhappy vocalization. In America, as indicated, the mother is more likely to leave her awake infant alone to go to sleep by himself, and he is less likely to cry because he has become accustomed to this procedure. When he does cry, the American mother often will briefly pat and talk to the baby but will not pick him up, and this bit of extra comforting is usually sufficient to induce sleep.[6]

The greater involvement of the Japanese mother when the infant shifts in the opposite direction from asleep to awake is also related to differences in the styles of caretaking in the two cultures. At first we thought that Japanese, more than American, mothers might be waking their babies in order to feed them on schedule in the case of bottle feeding, or because the pressure of milk in the mother's breasts led her to wake the infant in the case of breast feeding, but neither of these situations turned out to be so -- only two American and four Japanese mothers woke their babies in order to feed them, and in all of these cases feeding was by bottle. The answer to why the Japanese mother is more involved in the infant's waking lies, rather, in what the mothers in the two cultures do to sleeping babies. As indicated, the American mother largely restricts her care in this situation to checking visually on the baby, but the Japanese mother goes beyond this to do significantly more other care which involves physical contact with the baby or his bedding. This additional physical care frequently acts as a sufficient stimulus for the baby so that he wakes up, and this is often followed by crying.

The greater involvement of the Japanese mother in her baby's movement in and out of sleep might be interpreted as evidence of a greater concern for the comfort of the baby, but the result of this behavior is to make the Japanese infant more fretful and fussier specifically around matters concerned with sleep than is the American infant.[7] At this point a general and crucial question arises naturally: Why does the Japanese mother persist in a style of care that makes her baby fussier, especially when her goal

seems to be that of having a quiet and contented baby? The answer to this question is complex and would involve us in a cultural and psychological discussion of the self-image and behavior of the mother not only in relation to her child as infant but also over the course of his and her life cycle in Japan, and by comparison for the mother and child in America. Because of the complexity of this issue, we must defer even a beginning discussion of it until the conclusion of this paper.

For now, however, we believe we have identified one of the reasons for the greater unhappy vocalization of the Japanese infant in the greater involvement of his mother in matters related to sleep, and other reasons for his more prolonged unhappy vocalization will become apparent shortly. We also believe we have at least tentatively identified at this point one of the reasons for the greater happy vocalization of the American infant in the more frequent opportunities that the American mother provides for her baby to "talk" to her as she moves in and out of his presence while he is awake.

Since the effects of vocal communication between infant and mother can only really be studied when the infant is awake, we turn now to a closer examination of what happens in the vocalization of infants and mothers in the three states in which the infant is awake.

Mother's Responses to Infant's Vocalization in Various States

In order to explore the effects of vocalization in those states in which the infant is awake it is necessary first to establish the boundaries

of the behavioral episodes to be used in the analysis. From this point on, all data presented in Tables 4-7 are derived from the analysis of what we call "bounded episodes" which clearly have a beginning and an ending. As explained earlier, the observational data were gathered in ten-minute periods (each containing 40 observations made at fifteen-second intervals) with a break of five minutes between periods. Because we want to know what conditions, in terms of differing states, both precede and follow an episode in a given state, the episode itself must be confined within the ten-minute observational period. Moreover, the episode must occur betweeen the second and the thirty-eighth observation because the first and last observations on the sheet are reserved, at the maximum limits of an episode, for the purpose of bounding episodes in terms of the differing preceding and following states. Thus, an episode may vary in length from 1 to 38 observations, or in actual time from one-quarter of a minute to nine-and-a-half minutes. By definition, then, a "bounded episode" is a run of contiguous observations in a given state which is bounded at the beginning and ending by the occurrence of an observation in another state. [8] We call the preceding state the antecedent, and the following state the consequent, and whenever possible an analysis of episodes in a given state is controlled on the antecedent state while looking at the outcome in terms of the consequent state.

Using this definition of a bounded episode, we determined an average score for each case in terms of a particular problem, and then rank-ordered these scores and analyzed the resulting distribution by culture using a

Mann-Whitney U test as the statistic (see footnote 4). For example, let the general problem be that we want to know how long it takes mothers in the two cultures to respond to the unhappy vocalizations of their infants. One set of data bearing on this problem comes from the following circumstances: the antecedent condition is that the infant is awake and in the presence of his mother (states 1 or 2); the bounded episode occurs when the infant is awake and alone (state 3) and makes one or more unhappy vocalizations (and does not make any happy vocalizations); and the consequent condition is that the mother responds by coming into the awake baby's room (states 1 or 2). The score is the number of observations it takes the mother to respond from the time of the first unhappy vocalization. Suppose that instances of this set of circumstances occur in 29 (12 Japanese and 17 American) of the total 60 cases. In each of these 29 cases we obtain the average length of time (that is, the average number of observations) it takes a mother to respond, and then rank-order the cases on this basis and proceed with the analysis by culture to determine if there is a statistical difference between Japanese and American mothers in the average time of their response to the solely unhappy vocalization of their babies. The logical approach to the ordering and analysis of data that is illustrated by this example was used in all the analyses that will be referred to in the remainder of this paper.

Analysis of Bounded Episodes in State Three:
Infant Is Awake and Alone

The bounded episodes in which the infant is awake and alone can be divided into four types according to the kind of vocal behavior shown by

the infant during the episode: 1) he is silent throughout, 2) he has only unhappy vocalization, 3) he has mixed happy and unhappy vocalizations, and 4) he has only happy vocalization. In addition, when we control on the antecedent state as to whether the infant is awake (in states 1 or 2) or asleep (in states 4,5 or 6), and also control on the consequent state as to whether the mother responds to her awake infant (states 1 or 2) or the infant goes to sleep (states 4,5 or 6), we have a 2 x 4 x 2 design which results in sixteen possible logical sequences from antecedent to episode to consequent. We examined all these logical sequences but eight of them occurred so infrequently that the data are insufficient for analysis.[9] In the other eight sequences, however, we do have sufficient data. In five of these sequences the consequent is that the mother responds to her infant, and in the remaining three sequences the consequent is that the infant falls asleep by himself. Remember that in both of these classes of sequences the "rules of the game" are the same for infants and mothers in each culture, and that all parties start out equal -- the infants are awake and alone, and the mothers are out of the room.

The basic question in the first class of sequences is: How quickly do mothers in each culture respond to various kinds of vocalization by their babies? The answer is given in Table 4.

(Insert Table 4 about here)

As can be seen, in four of the five sequences analyzed in Table 4 it takes the Japanese mother significantly longer to respond to her baby.

Since two of these four sequences involve solely unhappy vocalization, it seems safe to conclude that it takes the Japanese mother longer than the American mother to respond to the unhappy vocalization of her baby when he is awake and alone. This provides us with another reason why the Japanese infant is, in general, more unhappily vocal -- it takes his mother longer to get to him from the time of his first signal.

When the infant is happily vocal, however, there is not a significant difference in the time taken to respond by mothers in the two cultures. But, note that the average time of response for the American mother is less than that for the Japanese mother in all five of the sequences (and significantly in four) in Table 4. It seems likely, therefore, that the American mother responds more quickly to her infant regardless of the nature of his vocalization when he is awake and alone.

Using the data represented in Table 4, we can begin to answer a further question: Is there a difference in the time taken by mothers in each culture to respond to their infants' unhappy as opposed to happy vocalization? In other words, is the mother making a meaningful discrimination in the kinds of vocalization by her infant? Using the two sequences in which the antecedent is awake we can compare the responses of the mothers in each culture, and the result is that the American mother responds more quickly to her infant's unhappy than happy vocalization (the average number of observations taken are 2.7 for unhappy and 5.0 for happy, $z = 2.59$, $p < 0.01$), whereas there is not a significant difference for the Japanese mother (5.4 for unhappy and 8.0 for happy, $z = 0.36$, n.s.). Thus, the

American mother is making more discriminating use of the vocal signals of her baby when he is awake and alone, and because of this it seems likely that the American baby is "learning" to make use of his voice in a more refined way.

Let us look now at the second class of sequences in which the consequent is that the infant goes to sleep by himself. Our question here is whether there is a difference between the cultures in the amount of time it takes infants to go to sleep when left to their own devices.

(Insert Table 5 about here)

It is clear from Table 5 that in the three types of sequences for which we have data, there are no meaningful differences between the two cultures in the time taken by infants to go to sleep when the mother does not respond. This finding again argues strongly for the similarity of biological processes in the two cultures when the infants are left to themselves.

Analysis of Bounded Episodes in State Two:
Infant Awake and Mother Present but Not Caretaking

As was true in the preceding section, it is possible to divide the bounded episodes here into four types of vocalization by the infant -- silent, unhappily vocal, mixed vocal, and happily vocal; and also to control for the antecedent state as to whether the infant is awake (states 1 or 3) or asleep (states 4,5, or 6). The consequent state is, however, a bit more complicated, and can be divided into three situations: 1) the mother responds by doing caretaking (state 1), 2) the mother leaves the room (state 3), and

3) the infant goes to sleep in the presence of the mother before there is any action on her part (states 4 or 5). These divisions give us a 2 x 4 x 3 design resulting in 24 logical sequences of antecedent, episode, and consequent. In 17 sequences the data are insufficient for analysis mainly because sequences in which the antecedent or consequent is asleep occur very infrequently. [10] In the seven sequences for which the data are adequate the antecedent is always awake and the consequent is either that the mother does caretaking or leaves the room. In this latter situation we know from a content analysis of the data that the mother usually is leaving to get something (a bottle, a diaper, etc.) for the baby.

(Insert Table 6 about here)

The basic question we are asking of the seven sequences indicated in Table 6 is the same as that asked in the earlier analysis: How quickly do mothers in each culture respond to various kinds of vocalization by their babies? Remember, however, that in the present situation the mothers are actually in the room, whereas earlier they were absent. This makes the "rules of the game" much more stringent.

The first finding to note in Table 6 is that once again the American mother is quicker to respond in general to her baby regardless of the nature of his vocalization. In all seven sequences the average time of response is less for the American mother, and this is significantly so in two of the sequences and of borderline significance in two others. [11]

Looking specifically at the response to the unhappy vocalization of the baby, the American mother responds faster than the Japanese mother both

by doing caretaking and by leaving the room to get the things necessary for caretaking. In either case, the longer time taken by the Japanese mother seems likely to increase the amount of the Japanese infant's unhappy vocalization, and this reinforces the same reasoning arrived at in the preceding analysis of the situation in which the infant is awake and alone.

Turning to the happy vocalization of the baby, the American mother responds more quickly to it by doing caretaking than does the Japanese mother. Although strictly speaking it goes beyond the limits of the data presented in Table 6, it is important to know that the response of the American mother more frequently includes chatting to the baby in answer to his happy vocalization as will be apparent in the next section, and has already been indicated at the beginning of this paper from the published results of the more general analysis of the data.

As we did in the preceding analysis, we can use the data represented in Table 6 to test whether the mothers in each culture discriminate between the unhappy and happy vocalizations of their babies by responding more quickly with caretaking to the unhappy vocalization. The results are not significant in either culture in the present situation where the mother is in the same room as her baby, but the pattern of the data is the same as in the preceding analysis. In both cultures the average time of response is less to unhappy vocalization, and the American mother is responding more quickly than is the Japanese mother (Japanese average time of response: 2.7 to unhappy and 5.4 to happy, $z = 1.03$, n.s.; American average time of

response: 1.7 to unhappy and 2.3 to happy, z = 1.31, n.s.).

In those sequences where the infant goes to sleep by himself, the data are not sufficient to control on the antecedent of asleep or awake, or to control for the type of vocalization in the episode. If we ignore these controls, however, and deal only with a more grossly defined situation in which the infant is awake in the presence of his mother and then goes to sleep, we do have enough data for a test. The score in this test is the average number of observations from the beginning of the episode that it takes the infant to go to sleep by himself. We have data for 11 Japanese and 9 American infants, with a Japanese mean of 4.5 and an American mean of 5.8 observations taken to go to sleep, and the z score of 1.22 is not significant. This finding again argues for the similarity of basic biological rhythms if the mothers do not interfere.

Analysis of Bounded Episodes in State One:
Infant Awake and Mother Doing Caretaking

In the analysis of bounded episodes in state 1 our basic question cannot be concerned as it was in the preceding analyses with how quickly a mother responds to various types of vocalization by her infant because in state 1 the mother and infant already are in interaction. We can, however, focus on the patterns of vocal behavior between mother and infant and ask how often on the average do these patterns occur within the bounded episodes of the 30 cases in each culture.

As before, the vocalization of the infant can be divided into four types -- silent, unhappy, mixed, and happy. Similarly the vocalization

of the mother can be divided into four types -- silent, only lulling, mixed lulling and chatting, and only chatting. The combination of these two classifications results in 16 logical kinds of vocal behavior between infant and mother.

We next examined the data to find out, in fact, which of these 16 kinds of vocal behavior occurred with sufficient frequency to permit comparative analysis. Our a priori criterion was that a kind of vocal behavior should occur in at least one-third of the cases in each culture. Seven kinds of vocal behavior met the criterion (and these can be seen in Table 7), while nine did not. [12]

Working with the seven kinds of vocal behavior which met the criterion, we looked at the number of cases available when, in addition, we controlled for the infant being awake (states 2 or 3) or asleep (states 4,5, or 6) both in the antecedent and consequent states. In such a 2 x 7 x 2 design there are 28 possible sequences, but the upshot of our examination was that the great bulk of cases in each culture occur in the seven sequences in which both the antecedent and consequent are awake. [13] Because of this, there appeared to be little point in controlling for the antecedent and consequent states, and we decided, therefore, simply to examine the average frequency of occurrence of bounded episodes in the seven kinds of vocal behavior over the 30 cases in each culture. [14] Table 7 gives the results of this inquiry.

(Insert Table 7 about here)

It is immediately apparent in Table 7 that the major difference between the cultures is the greater number of episodes in which the American

infant is happily vocalizing, and this is particularly true when his mother is chatting to him. We believe that this added vocal stimulation and encouragement by the mother carries over to those times when she is silent but the baby is happily vocal, probably in anticipation of a response from his mother. It should also be noted that the American mother is doing more chatting to her mixed vocalizing baby who is, of course, making a combination of unhappy and happy sounds. At the beginning of this paper we indicated that there is a positive correlation between the amount of chatting by the mother and the amount of happy vocalization by the baby in the American but not in the Japanese cases. From the present analysis we can see that there is, in fact, more of such verbal interaction between mother and baby in the American cases.

Discussion and Conclusion

We began this paper with the question of why should the American infant have a generally higher level of vocalization and particularly of happy vocalization, while the Japanese infant has more unhappy vocalization. We believe that the evidence we have presented goes a long way toward answering this question, and let us summarize what we have found. [15]

First of all, the pace of the American mother is livelier, she is more in and out of the room and thus is providing more naturally occurring opportunities to speak to her baby and for him to respond vocally as she comes to care for him. The American mother also responds more quickly to her baby's vocalizations, and even more importantly she differentiates more sharply between kinds of vocalization by coming to care for the baby in a shorter

time in answer to his unhappy than to his happy sounds. In this latter regard, the American mother appears to be "teaching" her infant to make a more discriminating use of his voice. Finally, the American mother has more vocal interaction with her baby, especially by chatting to him at the same time he is happily vocal. All of these findings are part of the American mother's style of caretaking which, we believe, serves to increase her infant's happy vocalization and, more generally, to emphasize the importance of vocal communication.

In contrast, the pace of the Japanese mother is more leisurely and, although she does not spend any more time in total in the care of her baby, her periods of caretaking are fewer and longer. She is more involved in the process of her baby's going to sleep and waking up. Part of the Japanese mother's style of caretaking is to carry, rock and lull her baby to sleep with the result that when the sleeping baby is put down he tends to awaken and cry, and the process begins again. In checking on the sleeping baby, the Japanese mother is more likely to go beyond glancing in at him to also doing other care which brings her into physical contact with the baby, and this added care often results in the baby waking and crying for a brief period. Thus, although the total time spent in sleep is not different for the Japanese baby, he is in and out of sleep more frequently and is more unhappily vocal during these transitions. The Japanese mother is slower to respond in general to her infant's vocalizations, and she does not discriminate between his unhappy and happy sounds by responding more quickly to one than to the other. Finally, the Japanese mother has less vocal inter-

action with her baby during caretaking. and this is particularly true for the situation in which the mother is chatting to a happily vocalizing baby. These aspects of the Japanese mother's style of caretaking help to explain why the Japanese infant should have a greater amount of unhappy vocalization. and also point to a lesser reliance on and refinement of vocal communication between mother and infant while, at the same time, emphasizing the importance and communicative value of physical contact.

Earlier we raised, but did not answer, the question of why the Japanese mother should persist in a style of care that led to her baby being fussier. This question is only a part of the even more general question of what lies behind and influences the specific styles of care shown by the mothers in the two cultures. In concluding this paper we can at least outline some of what we believe are the answers to this question.

The mother's perception of her infant, and of her relation to him, would seem to be different in the two cultures. In America the mother views her baby as, at least potentially, a separate and autonomous being who should learn to do and think for himself. For her, the baby is from birth a distinct personality with his own needs and desires which she must learn to recognize and care for. She helps him to learn to express these needs and desires through her emphasis on vocal communication so that he can "tell" her what he wants and then she can respond appropriately. She deemphasizes the importance of physical contact such as carrying and rocking, and encourages her infant through the use of her voice to explore

and learn to deal with his environment by himself. Just as she thinks of her infant as a separate individual, so also she thinks of herself as a separate person with her own needs and desires which include time apart from her baby in order to pursue her own interests, and also to be a wife to her husband as well as a mother to her baby. For this reason the pace of her caretaking is quicker, and when she is caretaking her involvement with the baby is livelier and more intense. Partly this is true because she wishes to stimulate the baby to activity and response so that when it is time for him to sleep he will remain asleep, and give her a chance to do other things -- both during the day and at night.

In Japan the mother views her baby much more as an extension of herself, and psychologically the boundaries between the two of them are blurred. The mother feels that she knows what is best for the baby, and there is no particular need for him to tell her what he wants because, after all, they virtually are one. Thus, in Japan, there is a greater emphasis on interdependence, rather than on the independence, of mother and child, and this emphasis extends into adulthood. [16] Given this orientation, the Japanese mother places less importance on vocal communication and more on physical contact; also, for her, there is no need for hurry as the expectation is that she will devote herself to her child without any great concern for a time away from him, or even for a separate time to be with her husband. As we know from other research (Caudill and Plath 1966), the Japanese child will ordinarily sleep together with his parents until he is approximately 10 years of age.

Given the differences in these two styles of care, we believe that the infants have learned to respond to them in culturally appropriate ways by three-to-four months of age. Since the differences that these styles of care elicit in the behavior of infants are in line with the later expectations for behavior in the two cultures, we can say that the infants have learned some of the rudiments of their culture by three-to-four months of age. This process takes place well before the development of the ability to use language in the ordinary sense, and hence these infants have already acquired some aspects of the "implicit culture" (Linton 1945, Kluckhohn 1951) of their group -- that is those ways of feeling, thinking, and behaving that go on largely out of awareness and that in general characterize the actions of people in a given culture.

We are fortunate in that, by design, we had the opportunity to follow up the behavior of the first 20 of these same children in each culture as they became two-and-a-half and six years of age, and we are about to begin analysis of these data. We can, therefore, test at these later ages whether or not the differences in vocal communication which we have found in infancy do, in fact, persist over the first six years of life. Our prediction is that this will happen, and that the early differences in behavior which we can already see in infancy will continue to develop and elaborate along the lines laid down by the two cultures.

Footnotes

1. In this article the terms "mother" and "caretaker" are used as equivalent because in the observations in each culture it was the mother who did the caretaking more than 90 per cent of the time. In the more general study (see Caudill and Weinstein 1969) all of the dependent variables concerning the behavior of mother and infant were precisely defined, and a satisfactory level of inter-observer reliability was established for each of them. In this article we use, of course, the same definitions for the various kinds of vocal behavior. By infant vocalization we mean any expressively voiced sound, and we did not include hiccups, coughs, and so on. Unhappily vocal means any negatively voiced sound, and has an inter-observer reliability of 89 per cent in the Japanese cases and of 88 per cent in the American cases. Happily vocal means any positively voiced sound, and has a reliability of 70 per cent in the Japanese cases and of 70 per cent in the American cases. The two variables are additive and can be combined into a composite variable called total infant vocalization. The vocalization of the mother is divided into chats and lulls. Lulls is a very delimited variable and means that the mother is softly singing or humming a lullaby, or making repetitive comforting noises, with the apparent intent of soothing and quieting the baby or getting him to go to sleep; it has a reliability of 94 per cent in the Japanese and of 100 per cent in the American cases. Chats includes all other vocalization to the infant, such as talking to him, singing to him in a lively fashion, and playing word games ("boo," "goo," etc.) with him; it has a reliability of 90 per cent in the Japanese and of 83 per cent in the American cases. The two variables are additive and can be combined into a composite variable called total talks to infant.

2. Like any broad generalization, this one needs qualification and explanation, but to do this here would take us too far afield from the main line of argument in this paper. Briefly, what is meant is that a child or an adult in America is expected to defend his opinions and rights and to take personal responsibility for his actions, whereas in Japan a person is expected much more to blend in as a member of his important reference groups and it is the group more than the individual that bears responsibility for actions. For further discussion along these lines see Caudill (MS.).

3. The probability values given in Table 1 and in all subsequent tables are "two-tailed," meaning that the conservative position is taken that the direction of the outcome of the results has not been predicted.

4. From this point on, in Table 2 and in all subsequent tables, the more complicated statistical procedure of analysis of variance is not used. Since, in the earlier analysis, we found that culture was overwhelmingly the most important independent variable, here culture is used as the only independent variable in an analysis of the rank-ordered distribution of the cases on a given dependent variable. For example, the 60 mothers represented in Table 2 are first rank ordered from 1 to 60 in terms of the number of changes of state shown by each mother, and then this distribution is examined to determine whether there is a significant difference in the ranked positions occupied by American as compared with Japanese mothers. The statistic used in the analysis presented in Table 2 and in all subsequent tables is the Mann-Whitney U test (see Siegel 1956: 116 - 127).

The results of this test can be given as a "z" score with its appropriate (two-tailed) probability value. Because the test is a non-parametric statistic (that is, the test is made in terms of positions in a rank order rather than in terms of numerical quantity), the means given in the tables are essentially illustrative and only indicate the direction and an approximation of the magnitude of an effect. The crucial findings are given by the "z" score and its probability value. The assistance of Mrs. Barbara Schmidt in the preparation and analysis of data in the foregoing manner is gratefully acknowledged.

5. Gradually we are coming to believe that "activity" in and of itself is a value in American culture. It is not too extreme to point to the greater physical activity and play of the American infants, and the greater busyness of the American mothers, in our study as specific examples of such a value. This line of thought will be developed further as the data collected on the same children at two-and-a-half and six years of age are analyzed.

6. It should be mentioned that these differences in the behavior of the mothers and three-to-four months old infants in the two cultures are not influenced by the chance factor of sickness. We did not make observations on days when either mother or infant was ill. In a separate body of research data, the tendency of the Japanese mother to fuss over her sleeping baby is vividly illustrated in several of the cases that Dr. Peter Wolff and I observed in Kyoto over the first month of life of the infant during a pilot study carried out in 1963. The results of this study have not been published

as we need to gather more data on the behavior of Japanese mothers and infants during the first month of life. Dr. Wolff has already gathered a substantial body of data on American mothers and infants during this very early period.

7. The problem that Japanese have with "sleep disturbances" keeps coming up again and again in separate studies done by ourselves and others. Iwawaki, Sumida, Okuno, and Cowen (1967) report that nine-year old Japanese children show significantly less anxiety in general (on the Children's Manifest Anxiety Scale) than do comparable groups of French and American children except on a cluster of three items pertaining to difficulty in going to sleep where the Japanese children show significantly more anxiety. In a comparative study of Japanese and American schizophrenic patients, we found that the Japanese patients show significantly more symptoms of sleep disturbance (Schooler and Caudill 1964). In general, on sleeping arrangements in Japan see Caudill and Plath (1966).

8. The "bounded episodes" used in the analysis presented here constitute a representative sample of all episodes which are 38 or less observations in length because it is a random matter over the total observations whether such episodes occur entirely within the ten-minute observation periods or have their beginning or ending during the five-minute breaks. We also examined all longer non-bounded episodes (those of more than 38 observations in length) in the three states in which the infant is awake. These do not occur with sufficient frequency to permit analysis in state 3 when the infant is alone, or in state 2 when the infant is in the presence of his

mother who is not doing caretaking. They do occur with greater frequency in state 1 when the mother is doing caretaking, but a separate analysis of these longer non-bounded episodes reveals the same findings as are discussed in the text for the bounded episodes in state 1.

9. The eight logical sequences in which the data are insufficient for analysis involve three sequences in which the consequent is that mother responds, and five in which the consequent is that the infant goes to sleep. The three sequences in which the consequent is that the mother responds are: 1) antecedent is asleep, episode is silent; 2) antecedent is asleep, episode is mixed vocalization; 3) antecedent is asleep, episode is only happy vocalization. The five sequences in which the consequent is that the infant goes to sleep are: 1) antecedent is awake, episode is only unhappy vocalization; 2) antecedent is awake, episode is mixed vocalization; 3) antecedent is awake, episode is only happy vocalization; 4) antecedent is asleep, episode is mixed vocalization; 5) antecedent is asleep, episode is only happy vocalization.

10. The 17 sequences in which data are inadequate are: 1) all 12 logical sequences in which the antecedent is asleep; 2) all four sequences in which the infant in the episode is silent, unhappily vocal, mixed vocal, or happily vocal and the antecedent is awake while the consequent is asleep; and 3) the antecedent is awake, the episode is mixed vocal, and the consequent is that the mother leaves the room. This latter sequence is indicated in Table 6 to maintain the symmetry of the table even though the data are insufficient.

11. As stated earlier, all probability values are given in terms of two-tailed tests meaning that we do not assume that we have predicted the direction of a finding, although by now it would be a fairly safe bet that the Japanese mother would be slower in her response to her infant's vocalization. If we make the latter assumption, then four of the seven tests are significant. What seems remarkable to us, and increases our credence in the findings, is that any of the tests are significant since the mothers start out in this situation by being present in the same room with their babies.

12. There is, nevertheless, something of interest to be learned from three of the nine kinds of behavior which do not meet the criterion; all three concern the mother's lulling of an awake infant who, respectively, is silent (3 Japanese and 1 American cases), unhappily vocal (6 Japanese and 1 American cases), or happily vocal (2 Japanese and no American cases). As indicated, there are more cases of Japanese mothers in all three of these kinds of vocal behavior. The other six kinds of vocal behavior which do not meet the criterion are: 1) a silent mother does caretaking for a mixed vocal baby (2 Japanese and 5 American cases); 2) a mother is mixed vocal to a mixed vocal baby (no Japanese and 1 American case); and 3) four kinds which never occur in either culture: a mother is mixed vocal, respectively, to a silent, to an unhappily vocal, and to a happily vocal baby, and finally, a mother lulls a mixed vocal baby.

13. Beyond these seven sequences, there are only two others that contain enough cases to be interesting. In each of these the antecedent and

consequent are that the infant is asleep, and both sequences mainly involve Japanese mothers. In one, the mother is silent as she cares for her awake and silent baby (16 Japanese and 2 American cases), and in the other, the mother chats to an awake and silent baby (5 Japanese and 1 American cases). It seems clear that the essence of the meaning of these two sequences has already been covered in the earlier discussion of the greater involvement of Japanese mothers in the waking of infants.

14. We also did parallel analyses of the average length of episodes, and also, where appropriate, of the average number of observations per episode of verbal behavior by the mother and by the infant. In general, however, there were no differences between the cultures in the length of episodes or in the amount of verbal behavior within the episodes. The best and simplest measure, therefore, proved to be the one we are using here: the average frequency of occurrence of episodes of a given kind of verbal behavior.

15. A caution is necessary here. Strictly speaking, our results obtain for first-born infants in middle-class urban families in Japan and America. We feel, however, that our findings have a broader applicability, particularly in the more general form in which they are stated in this concluding section of the paper.

16. For a discussion of the emphasis on interdependence in its various aspects in Japan see: Caudill and Doi 1963, Caudill and Scarr 1962, Caudill 1962, and Caudill MS.

Table 1
CULTURAL COMPARISON OF ADJUSTED MEAN
FREQUENCIES FOR TIME IN SIX STATES

States	Japanese (N=30 cases)	American (N-30 cases)	Correlation*	p<
Infant Awake				
1. Mother Present and Caretaking	286	321	.16	n.s.
2. Mother Present but Not Caretaking	103	53	.34	0.05
3. Mother Absent	106	119	.08	n.s.
Total Infant Awake	495	493	.01	n.s.
Infant Asleep				
4. Mother Present and Caretaking	52	16	.37	0.01
5. Mother Present but Not Caretaking	100	32	.45	0.001
6. Mother Absent	153	259	.42	0.001
Total Infant Asleep	305	307	.01	n.s.
Total Observations	800	800		

* Findings are presented in terms of a one-way analysis of variance in which culture is the independent variable in question, and findings are controlled for the effects of father's occupation (salaried, independent) and sex of infant (male, female). The partial correlation used is the square root of the ratio of (a) the sum of the squared deviations from the mean attributable to culture, to (b) the total sum of the squared deviations minus the sum of the squared deviations attributable to the control variables of father's occupation and sex of infant and their interactions.

Table 2
MEAN FREQUENCY OF MOTHER'S CHANGES OF STATE
AND RESULTS OF ANALYSIS OF RANK ORDER DISTRIBUTION BY CULTURE

Culture	Mother Changes State from:								Total Mean Changes of State
	Caretaking to Not Caretaking* Infant Is:		Not Caretaking to Caretaking** Infant Is:		Merely Present to Absent+ Infant Is:		Absent to Merely Present++ Infant Is:		
	Awake	Asleep	Awake	Asleep	Awake	Asleep	Awake	Asleep	
Japanese (N=30 cases)	16.2	4.5	16.8	3.9	2.4	2.7	2.0	1.9	50.4
American (N=30 cases)	27.1	7.9	26.8	7.9	3.4	1.4	2.5	1.2	78.2
z score	3.37	1.01	2.94	1.76	1.29	2.17	0.83	1.69	3.46
p<	0.001	n.s.	0.01	n.s.	n.s.	0.05	n.s.	n.s.	0.001

* Includes all changes from state 1 (infant awake) or state 4 (infant asleep) to states 2,3,5, or 6.

** Includes all changes from states 2,3 (infant awake) or states 5,6 (infant asleep) to states 1 or 4.

+ Includes all changes from state 2 (infant awake) or state 5 (infant asleep) to states 3 or 6.

++ Includes all changes from state 3 (infant awake) or state 6 (infant asleep) to states 2 or 5.

Table 3
MEAN FREQUENCY OF INFANT'S CHANGES OF STATE
AND RESULTS OF ANALYSIS OF RANK ORDER DISTRIBUTION BY CULTURE

Culture	Infant Changes State from:				Total Mean Changes of State
	Awake to Asleep* Mother Is:		Asleep to Awake** Mother Is:		
	Involved	Not Involved	Involved	Not Involved	
Japanese (N=30 cases)	4.2	3.5	2.6	5.0	15.3
American (N=30 cases)	1.5	4.2	0.8	4.4	10.9
z score	3.59	1.09	2.44	1.08	2.45
p<	0.001	n.s.	0.05	n.s.	0.05

* Includes all changes from state 1 (mother involved) or states 2,3 (mother not involved) to states 4,5, or 6.
** Includes all changes from state 4 (mother involved) or states 5, 6 (mother not involved) to states 1,2, or 3.

Table 4

SIGNIFICANCE OF RANK ORDER DISTRIBUTION BY CULTURE OF NUMBER OF TIMES MOTHER TO RESPOND TO INFANT'S VOCALIZATIONS IN STATE THREE: INFANT AWAKE AND ALONE

Culture	Average Number of Observations Taken by Mother to Respond from Time of Infant's First Signal When Infant Is:*				
	Silent: Antecedent Awake	Unhappily Vocal: Antecedent Awake	Unhappily Vocal: Antecedent Asleep	Mixed Vocal: Antecedent Awake	Happily Vocal: Antecedent Awake
Japanese	5.1	5.4	6.2	21.7	8.0
American	2.9	2.7	3.0	11.3	5.0
Number of Cases	Jpse 20 Amer 29	Jpse 12 Amer 17	Jpse 10 Amer 4	Jpse 5 Amer 17	Jpse 10 Amer 25
z score	2.15	2.04	2.90	2.62	0.93
p<	0.05	0.05	0.01	0.01	n.s.

*Is omitted to conserve space; the averages for the mothers in each culture.

Table 5

RESULTS OF ANALYSIS OF RANK ORDER DISTRIBUTION BY CULTURE

OF THE TIME IT TAKES FOR INFANTS TO GO TO SLEEP WHEN MOTHER DOES NOT RESPOND

IN SPACE THREE: INFANT AWAKE AND ALONE

Culture	Average Number of Observations Taken by Infant to Go to Sleep When Infant Is:*		
	Silent: Antecedent Awake	Silent: Antecedent Asleep	Unhappily Vocal:** Antecedent Asleep
Japanese	5.5	1.7	2.5
American	4.8	1.9	1.8
Number of Cases	Jpse 4 Amer 5	Jpse 14 Amer 20	Jpse 7 Amer 6
z score	no test used	0.93	0.44
p<	n.s.	n.s.	n.s.

*This number is obtained by averaging the averages for the infants in each culture.

**Time taken to go to sleep is measured by the number of observations from the first unhappy vocalization.

Table 6

ANALYSIS OF RANK ORDER DISTRIBUTION BY CULTURE OF STATE USED BY MOTHER TO RESPOND TO INFANT'S VOCALIZATIONS IN STATE TWO: INFANT AWAKE AND MOTHER MERELY PRESENT

	Average Number of Observations Taken by Mother to Respond from Time of Infant's First Signal When Infant Is:*							
	(Antecedent Is Awake in All Sequences)							
Culture	Silent: Mother Does Caretaking	Silent: Mother Leaves Room	Unhappily Vocal: Mother Does Caretaking	Unhappily Vocal: Mother Leaves Room	Mixed Vocal: Mother Does Caretaking	Mixed Vocal: Mother Leaves Room	Happily Vocal: Mother Does Caretaking	Happily Vocal: Mother Leaves Room
Japanese	2.4	2.1	2.7	2.0	9.8	Insuf-ficient	5.4	3.5
American	1.8	2.0	1.7	1.0	6.1	Data	2.3	1.8
Number of Cases	Jpse 28 Amer 30	Jpse 17 Amer 24	Jpse 19 Amer 16	Jpse 8 Amer 6	Jpse 9 Amer 7	Jpse 0 Amer 1	Jpse 17 Amer 26	Jpse 7 Amer 12
z score	1.78	0.81	1.85	2.32	0.85		2.11	0.51
p <	0.08	n.s.	0.07	0.05	n.s.		0.05	n.s.

*The lower the number is the shorter the average for the mothers in each culture.

Table 7

MEAN FREQUENCY OF BOUNDED EPISODES OF VOCAL BEHAVIOR

AND RESULTS OF ANALYSIS OF RANK ORDER DISTRIBUTION BY CULTURE

IN STATE ONE: INFANT AWAKE AND MOTHER DOING CARETAKING

Culture	Mother Is Silent:			Mother Chats To Infant:			
	Infant Is Silent	Infant Is Unhappily Vocal	Infant Is Happily Vocal	Infant Is Silent	Infant Is Unhappily Vocal	Infant Is Mixed Vocal	Infant Is Happily Vocal
Japanese (N = 30 cases)	5.7	0.8	0.5	3.6	1.6	0.4	1.1
American (N = 30 cases)	6.2	0.8	2.5	3.6	1.4	1.4	4.0
z score	0.02	0.30	3.77	0.13	0.24	3.21	4.72
p <	n.s.	n.s.	0.001	n.s.	n.s.	0.01	0.001

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